

# PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventors: BOHUMIL PEĽESKA and VLADIMIR BĚČEK

1.161.579

Date of Application and filing Complete Specification: 17 March, 1967.

No. 12648/67.

Application made in Czechoslovakia (No. 2000) on 25 March, 1966.

Complete Specification Published: 13 Aug., 1969.



Index at acceptance:—A5 R(85D3, 85F1)

International Classification:—A 61 n 1/36

## COMPLETE SPECIFICATION

### Improvements in or relating to Cardiac Stimulators

5 We, CHIRANA, ZAVODY ZDRAVOTNICKÉJ  
TECHNIKY, ODBOROVY PODNIK, a Czechoslovakian Body Corporate of Stara Tura,  
Czechoslovakia, do hereby declare the invention,  
for which we pray that a patent may  
be granted to us, and the method by which  
it is to be performed, to be particularly described  
in and by the following statement:—

10 This invention relates to a cardiac stimulator  
for implantation in the human body,  
and having an electrode forming part of the  
surface of the apparatus for connection with  
one of the terminals of a pulse generating  
means.

15 The cardiac stimulator is a generator of  
electrical pulses used for the control of the  
heart function during heavy anomalies of  
the heart rhythm. This very small generator  
with batteries is provided within an envelope  
20 made of material compatible with the environment  
of the human body to permit its implantation  
and permanent location therein. A first output  
terminal of the pulse generator, the stimulating  
terminal, is connected by an  
25 electrical conductor to a first electrode implemented  
in the myocardium. A second output terminal  
of said pulse generator is connected in the  
unipolar stimulation method, to the tissue of  
the front abdominal wall  
30 near the implanted apparatus by a second electrode.  
For effecting this latter connection the present  
cardiac stimulators use a conductor several  
centimetres in length which is connected by  
one end to the apparatus and the other end is  
35 stitched to human tissue. With this arrangement  
breaking-off from the apparatus, and interruption  
and disconnection from the human tissue occurs.  
According to another arrangement the connection  
of the conductor or leads with the tissue is  
40 effected in that the second electrode forms a  
part of the surface of the apparatus and dur-

ing the implantation period permanently  
contacts the tissue. Such a second electrode used  
to take the form of a wire loop located on  
the apparatus periphery. With such an  
arrangement provided with a small electrode  
surface of less than 1 square centimetre, a  
considerable current density appears at the  
electrode-tissue junction.

50 For this reason undesirable tissue stimulation  
can be evoked near the location of the  
apparatus in the human body. The electrode  
of other known apparatus used to be designed  
in the form of a plane metal plate located on  
the surface of the apparatus. Long term  
reliable conductive connection is not obtained  
with this type of apparatus because of the  
flesh envelope formed by the organism  
55 around the implanted apparatus.

60 According to the invention there is provided  
a cardiac stimulator for implantation into  
the human body having a first electrode for  
fixing to the myocardium and a second  
electrode forming an integral part of the  
65 side wall and of the bottom of the stimulator,  
this second electrode having the shape of a  
tape and being located such as to pass from  
the side wall to the bottom over one common  
edge formed by said side wall and the  
70 bottom of the stimulator.

75 In our copending British Patent Application  
No. 12647/67 (Serial No. 1,161,578) we describe  
and claim a cardiac stimulator for implantation  
in the human body, wherein a channel receiving  
an electrical conductor opens into a recess in  
the envelope of the stimulator, whereby the  
conductor can be looped about the envelope  
without forming a sharp bend.

80 An embodiment of a cardiac stimulator in  
accordance with the invention will be now  
described by way of example with reference  
to the accompanying drawing, wherein:

[Price

Figure 1 shows the front view of the cardiac stimulator and

Figure 2 a view from below of said cardiac stimulator.

- 5 The cardiac stimulator consists of an apparatus contained in an envelope 1 made of material compatible with the environment of the human body to permit its implantation therein, said apparatus comprising first and second electrodes, said second electrode 2 located according to the drawing and forming a part of the apparatus. Said second electrode 2 passes on the bottom part of the cardiac stimulator over the edge into the bottom of the envelope 1. The screws 4 secure the fixation of the electrical conductor (not illustrated) of the first or stimulation electrode in the channel 5. The second electrode 2 is elongate with a width of 15 mm, which forms a part of the flat side wall of the envelope and passes over its bottom edge. The total surface of this electrode is preferably at least 5 square centimetres.

- 25 This embodiment of the invention obtains on the one hand a reliable connection of the second electrode 2, by passing the electrode over the edge of the stimulator to connect, with the human tissue, and on the other hand has with regard to its elongate form a low

current density which is less than the stimulation threshold of human tissue.

Mechanical failure, for example the break-off of the electrical conductor which, in known stimulators, connects the second electrode with the tissue, is eliminated by this design.

#### WHAT WE CLAIM IS:—

1. A cardiac stimulator for implantation into the human body having a first electrode for fixing to the myocardium and a second electrode forming an integral part of the side wall and of the bottom of the stimulator, this second electrode having the shape of a tape and being located such as to pass from the side wall to the bottom over one common edge formed by said side wall and the bottom of the stimulator.

2. A cardiac stimulator substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

CHIRANA, ZAVODY ZDRAVOTNICKEJ  
TECHNIKY, ODBOROVY PODNIK,

Per:

Boult, Wade & Tennant,  
112, Hatton Garden,  
London E.C.1.  
Chartered Patent Agents.

1161579

COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

